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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,566	03/01/2002	Masahiro Furo	134.142	3943

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EXAMINER

XU, LING X

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 08/25/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

10/087,566

Applicant(s)

FURO ET AL.

Examiner

Ling X. Xu

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1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> . | 6) <input type="checkbox"/> Other:  |

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## DETAILED ACTION

### *Drawings*

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, it states the metal alloy layer formed on at least one surface portion of the ceramic substrate board and the semiconductor tip formed on the other surface of the ceramic substrate board. It is unclear if the metal alloy layer is on the same side of the surface of the ceramic substrate with the semiconductor tip. Also, the term "at least one surface" implied that the metal alloy layer can be formed on the entire surface of the ceramic substrate board, and it is unclear where the "other surface" of the ceramic substrate board, where the semiconductor tip formed, is located. The location of the

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claimed metal layer related to the semiconductor tip on the ceramic substrate board is unclear.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Copetti et al. (US 2001/0017770).

Copetti discloses a module comprises a first conducting layer on an insulating substrate (Page 1, [0008]). The conducting layer consisting mainly of Al doped with a few percents of Si (page 1, [0022]). Embodiment 3 shows that Al is doped with 4% of Si (Page 4, [0075]), which is within the range recited in claim 2.

Copetti also discloses the insulating substrate is made of alumina (page 1, [0018]).

Since Copetti discloses the module comprises the same structure as claimed, the same structure will inherently have the same properties as claimed such as having the Vickers hardness of not less than 25 and not more than 40.

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***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al (US 6,122,170) in view of Boutin et al (US 4,222,774).

Hirose discloses a power module board comprise an insulting substrate board comprises a ceramic substrate and a metal layer consisting mainly of aluminum (Col. 4, lines 15-20).

With respect to claims 8-12, Hirose discloses the ceramic substrate board is aluminum nitride or silicon nitride (Col. 4, lines 13-20).

With respect to claims 13, Hirose discloses a power module board comprises a semiconductor chip, IGBT chip or the like, fixed onto at least one surface of the ceramic base plate with a conductive layer made of Al (Col. 9, lines 5-15) interposed therebetween and another metal layer also made of Al (Col. 9, lines 5-15) formed onto other surface of the ceramic base pate (Abstract).

As stated above, the location of the claimed metal layer related to the semiconductor tip on the ceramic substrate board is unclear in the claim. One of the conductive layer and the metal layer disclosed by Hirose is considered functionally equivalent to the claimed metal layer.

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Hirose further discloses a metal film (the same as the claimed "metal base plate") is provided entirely on the rear surface of the ceramic base plate (Col. 9, lines 15-25).

With respect to claims 20-24, Hirose discloses the ceramic substrate board is aluminum nitride or silicon nitride (Col. 4, lines 13-20).

Hirose does not disclose the metal layer comprises small amount of Si, Mn, and/or Mg.

With respect to claims 2-7 and 14-19, Boutin teaches an aluminum alloy for use in the production of the articles subjected to elevated temperature comprises 1.0-1.5% of Si, less than 0.2% of Mg and 0.9-1.5% of Mn (Abstract).

Boutin also teaches that the aluminum alloys has improved mechanical characteristics during and after the aluminum alloys exposure to elevated temperature (Col. 1, lines 1-25).

Therefore, it would have been obvious to one of ordinary skill in the art to use the aluminum alloy as taught by Boutin in Hirose's aluminum layer in order to improved mechanical characteristics during and after the aluminum layer exposure to elevated temperature when the power module has large amount of heat build up during the operation process.

Since Hirose and Boutin disclose the module comprises the same structure as claimed, the same structure will inherently have the same properties as claimed such as having the Vickers hardness of not less than 25 and not more than 40.

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 703-305-0395.

The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah D. Jones can be reached on 703-308-3822. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Ling X. Xu  
Examiner  
Art Unit 1775

lx

LX

  
DEBORAH JONES  
SUPERVISORY PATENT EXAMINER